

The question remains as to whether the Query Service qualifies for the application of the overhead factors under the Commission's existing orders. The answer is "yes," since the Query Service is a new access service it qualifies for the application of these loadings. In fact, the Query Service is comparable to an ONA basic service element ("BSE") upon which the Commission has authorized the recovery of reasonable overhead loadings for over five years.

4. Ameritech's Demand Forecasts Are Reasonable.

In paragraph 10 of the Order, the Commission designated for investigation "whether the carriers' basis for their demand forecasts are reasonable, and how carriers should treat their own demand for queries." The Commission also instructed the parties to "indicate whether they base their demand forecasts on queries for interstate traffic, intrastate traffic, or both." In answer to the Commission's question, Ameritech based its demand projections on its understanding of other carrier's plans, and its general knowledge of access traffic volumes and usage.

As stated earlier, Ameritech considered the projected level of query demand, when it determined the allocation of joint number portability costs to the Query Service. The allocation was made on the basis of projected utilization of the facility, equipment or software involved based upon the relative demand projections. Also, as discussed earlier, Ameritech used

unseparated costs to develop a uniform intrastate and interstate rate. As such, Ameritech properly used combined projected demand for both intrastate and interstate traffic.

Ameritech developed its the demand forecast for the Query Service starting with its projections of non-Ameritech terminating access traffic to Ameritech's End Offices and Tandem switches during the relevant period. It then estimated the percent of that traffic that would be unqueried. In order to best calculate that percentage, Ameritech (1) sent letters to interconnected carriers requesting whether they intended to send unqueried traffic to Ameritech, and if so at what level [Attachment 3]; and (2) conducted informational meetings with other incumbent LECs to ascertain the same information. [Attachment 4.] Although Ameritech requested this demand information from N-1 carriers in a good faith effort to obtain all available information it needed to project these carrier's needs, Ameritech did not receive any responses to its request.

Without actual carrier forecast information from the non-incumbent LEC carriers, Ameritech estimated demand based upon its knowledge of LNP, and the plans of these carriers. For example, Ameritech considered which carriers had SS7 capability or were deploying LNP capabilities, in an effort to determine the carriers who would likely prearrange with some

other carrier to meet their N-1 responsibility, e.g., other incumbent LECs associated with Illuminet who is currently marketing N-1 Query services.

Specifically, as described in Ameritech's Description and Justification Transmittal No. 1123, Ameritech's demand forecast was based on the following projections: (1) that the top three interexchange carriers will meet their N-1 carrier responsibilities through the use of their own databases and will not require Ameritech to perform queries, (2) the next top three interexchange carriers would likely only require that Ameritech perform queries on their traffic through the first half of 1998, and (3) Ameritech would perform queries on behalf of wireless carriers through 1999, when they are required to provide number portability on their own numbers. Ameritech determined that most of the balance of the interexchange carriers would likely use Ameritech's Query Service on either a prearranged or default basis during the tariff period, and included them in its demand forecast.

Ameritech's conclusion that it will receive little or no unqueried traffic for the three largest interexchange carriers was based on, (1) the participation of those carriers in the FCC LNP Field Trial in Chicago, and (2) the carriers' statements made in the Illinois Commerce Commission's LNP Workshops that they would install their own databases. Ameritech's conclusion that the next three largest interexchange carriers would also

likely send little or no unqueried traffic to Ameritech was based upon its understanding at the time that these interexchange carriers desired to implement N-1 query capability in their networks sometime in the second half of 1998.

Ameritech's inclusion of demand from wireless carriers through 1999 was based on, (1) the release time frame of vendor software to implement long-term number portability for wireless carriers, and (2) the fact that wireless carriers are not required to implement number portability until 1999. Further, a number of wireless carriers have publicly stated in comments and waiver petitions filed with the Commission, that they are not yet prepared to implement LNP.

Also, as previously discussed, the projected demand for the Query Service includes both interstate traffic and intrastate traffic. A combined demand forecast was used since Ameritech will charge the same rate to all N-1 carriers regardless of jurisdiction. The inclusion of both interstate traffic and intrastate traffic is required to develop a single per unit query cost for both intrastate and intrastate queries.

The bottom line is that only approximately 15% of the query demand is applicable to the Query Service. Equally as important, costs were allocated on the basis of the demand and there will be no double recovery.

5. Ameritech's Nonrecurring Default Billing Charge Is Reasonable.

The Commission designated for investigation in paragraph 14 of its Order, whether the Query Service nonrecurring billing charges "are lawful, whether these 'nonrecurring' charges are actually being applied on a recurring basis, and whether these rates have been set at appropriate levels. The Commission also asked responding parties to "explain with specificity how they derived these rates." The answer is that this charge is properly a non-recurring charge that recovers costs that are only occur when an N-1 carrier sends Default Traffic to Ameritech. The rate is set at a level to recover those direct costs, plus a reasonable loading. The charge specifically recoups costs Ameritech incurs in manually identifying the carrier responsible for the traffic and in making arrangements to bill the applicable charges each month.

N-1 carriers who prearrange with Ameritech to perform queries on their Default Traffic establish a billing relationship with Ameritech, and provide in advance information needed for billing, e.g. switches where queries would be performed, Carrier Identification Codes ("CIC") and billing accounts. This data enables Ameritech to establish on-going billing arrangements for the prearranged carriers in the switches and systems involved that permits billing on an automated basis. Thus, Ameritech does

not have to manually investigate or re-establish billing arrangements every month on prearranged traffic, and it does not charge the billing nonrecurring charge on an on-going basis.

Conversely, N-1 carriers who dump Default Traffic into Ameritech's network do not provide in advance the information Ameritech needs to automatically identify and bill for that traffic. As such, Ameritech is required each month to manually identify and investigate Default Traffic to determine the N-1 carrier responsible for it, and to prepare it for billing. The billing charge is based on the estimated number of hours Ameritech's service center personnel will expend to manually sort through the Default Traffic query usage, times Ameritech's standard labor rate for the job category involved. To this direct cost, Ameritech applied the overhead loading factor discussed above.

The Default Billing Charge is classified as "nonrecurring" because it only occurs when Ameritech manually investigates and bills an N-1 carrier for Default Traffic. Therefore, the billing charge may not be assessed each month to an N-1 carrier, but only when that carrier sends Default Traffic to Ameritech. The treatment of the billing charge as a non-recurring charge is consistent with the criteria Ameritech routinely uses to classify access service rates as "recurring" and "nonrecurring." A "recurring" rate is applied to the customer account from the time a service is ordered until the

service is discontinued by the customer. The billing system classifies a “nonrecurring” as one time charge or a conditional charge based on a event. The default billing charge is a conditional charge based upon the service center’s need to manually investigate Default Traffic usage and to prepare it for billing. Therefore is properly a “nonrecurring” charge.

Ameritech believes it is reasonable and proper to recover the additional labor costs involved in manually investigating and billing for Default Traffic. Other carriers and customers should not have to subsidize these carriers. The application of the charge also serves as an inducement for carriers to prearrange for the handling of their unqueried traffic, a step that reduces costs and increases network reliability.

**6 The Forecasts and Blocking Provisions Are Necessary to Preserve Network Reliability.**

The Commission designated for investigation at paragraph 13 of its Order, whether Ameritech’s “proposed estimates for prearranged query service are lawful and reasonable, particularly in light of Ameritech’s intention to base its blocking standard on such estimates.” The Commission asks Ameritech to:

describe precisely the information it seeks, to explain its reasons for requiring such information, and to indicate whether it requires carriers to identify the specific offices to which the N-1 carrier intends to deliver unqueried traffic or whether it is sufficient for them to specify in aggregate how much unqueried traffic they will deliver to

end offices and how much to tandem offices.

The Commission also asks whether the estimates are “burdensome.” In particular, the Commission inquires whether Ameritech’s tariff complies with the Commission’s orders in Docket 95-116, in particular the requirement that LECs block on a “nondiscriminatory” basis” and “only in circumstances when a failure to do so is likely to impair network reliability.” The Commission finally noted that it had held that it would “allow LECs to block default-routed calls” but did not say such blocking would be permissible for “prearranged calls.”

Ameritech’s request for forecasts of unqueried traffic is designed to establish normal joint planning between connecting carriers. Such forecasting is essential to enable Ameritech to engage in network facility planning with N-1 carriers so Ameritech can anticipate changes in traffic demands before they occur and thereby avoid congestion. This type of joint cooperation has for many years been used in the access marketplace to help ensure that LECs have sufficient facilities to handle switched access traffic from interexchange carriers.

As the North American Numbering Council (“NANC”) found and the Commission recognized in its Second Number Portability Order, Default Traffic poses a risk of network “overload or congestion” and that allowing LECs to “block” Default Traffic is necessary to preserve network



reliability.<sup>10</sup> The request for forecasts responds in a constructive way to reducing this concern by helping to ensure that network congestion does not occur in the first place.

In regard to the Commission's question if forecasting of traffic volumes creates a burden, Ameritech points out that forecasting of traffic levels has been a necessary part of normal network planning for all carriers, and that default N-1 carriers will likewise need to forecast their own traffic so they can design and engineer their networks. All that Ameritech is asking is that these carriers share that information with Ameritech, so it can design and engineer its network to handle the traffic it will receive from the N-1 carriers.

Anticipating and controlling network traffic levels is an essential requirement of number portability network reliability. Components of Ameritech's SS-7 signaling network have been deployed in mated pairs to ensure uninterrupted service, even in the event of a (single) node failure. This has been accomplished by engineering each individual component to handle no more than 40% (0.4 Erlang) of its available (10HDBH) capacity. The use of mated pairs is in compliance with generally accepted industry requirements, as detailed in Bellcore documentation GR 905 CORE. The standard is necessary so that if one component fails, its in-service mate can

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<sup>10</sup> at ¶¶76-78.

handle both its own load and the load of its failed partner. To do otherwise would defeat the entire purpose of having mated pairs, since each unit would not have the available capacity to back-up the other. That is to say, under the Bellcore standard, even after one component failure, its in-service mate should still only be operating at 80% of its available capacity. Since the remaining 20% must be reserved to provide a cushion to handle peak conditions and essential maintenance overhead messaging, at this point the traffic load is considered to be at a critical level.

Thus, any volume of traffic that exceeds 80% of the capacity of one of the mated-pair of component involved in processing the calls, immediately places the SS7 network in an unstable and unpredictable condition. Unless that situation is promptly remedied, it creates a high potential of spontaneous loss or delay in call processing, both at the immediate point of congestion, and in a domino-like fashion, at other interconnecting points.

As such, Ameritech and other SS7 network providers have always felt a strong obligation to take all necessary steps to prevent and promptly remedy situations where they do not have sufficient capacity so that a single component failure would cause network blockage. Since individual component failures can and do occur, Ameritech takes all reasonable steps to have sufficient spare capacity to handle such situations. This means that signaling traffic on a mated pair should not be allowed to exceed 80% of the

available capacity of each single component. Ameritech has proposed to apply the same principle here and to block unforecasted unqueried traffic that causes traffic levels to exceed the 80% threshold.

In order to help ensure that the 80% threshold is not exceeded, Ameritech has requested that all N-1 carriers intending to forward unqueried traffic to Ameritech, identify themselves, and to provide rolling three-month forecasts of the estimated traffic volume which will be forwarded to Ameritech's tandems or end offices. Such information should be provided by monthly total and maximum busy hour counts. This level of detail is required to answer two questions for the traffic engineers: 1) Which signaling components may be impacted by external LNP query demands? and 2) How much additional load will be placed upon those components?

In answer to the Commission's question about simply providing aggregate traffic volumes without identifying the delivery point, (end office or tandem), such aggregate data would serve no useful purpose, since it does not tell Ameritech which facilities may need to be augmented. For instance, augmenting link sets serving a downtown Chicago tandem switch or end office, does no good if the additional traffic load is sent to a north suburban switch.

It should also be recognized that network engineering is an ongoing process - literally thousands of signaling components must be continuously monitored. The need for augmentation is route and switch specific and must be performed to each such component before demand increases. The fact that a component met yesterday's demand does no good if that demand has significantly increased today. Thus, the demand projections must be made months in advance and updated on a regular basis.

The interconnecting carriers themselves are the only parties in a position to forecast how much traffic they will be generating and where it will be delivered. No carrier should be expected to size, at its own peril, its network to handle any amount of volume of spontaneous or non-forecasted traffic. They also should not be required to speculate on the market plans of other carriers. Such an obligation would lead to stranded resources and costly overbuilds.

Regarding network blocking, in its Second Number Portability Order, the Commission authorized LECs "to block default traffic routed calls when performing database queries. . . is likely to impair network reliability." The Commission also required that the blocking standard be applied "to calls from all carriers on a nondiscriminatory basis."<sup>11</sup> Ameritech's blocking proposal simply implements the Commission's requirement that LECs

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<sup>11</sup> at ¶78.

block unqueried traffic that may impair network reliability on a nondiscriminatory basis. The principle of first blocking the traffic that is causing network impairment that underlies Ameritech's proposal and the Commission's order has long been established in Ameritech's access and state tariffs [See Attachment 5] and is good policy for several reasons. First, it encourages carriers and customers to act responsibly and avoid network congestion. Second, it provides an incentive for the offending customers or carriers to remedy the situation. Third, it helps reduce the number of incidents of call blockage and harm to the network. Fourth, it protects innocent customers and carriers from having their service degraded through the acts of others.

In response to the Commission's concern about the potential blocking of calls from prearranged carriers that exceed their forecasts by 125%, Ameritech points out that the same rationale that underlies the Commission's determination that LECs should block Default Traffic causing congestion problems, also compels the blocking of traffic that significantly exceeds forecasts and is thereby causing congestion. From a network planning perspective, a grossly inadequate forecast is no better than no forecast at all, since both create the same risk of congestion and network harm. The key objective should be not only to encourage N-1

carriers to provide forecasts, but provide an incentive for them to provide as accurate forecasts as possible.

Thus, Ameritech believes that the Commission's policy of nondiscriminatory blocking to preserve network reliability is best accommodated by applying blocking to all N-1 carriers that cause an overload condition.<sup>12</sup> In order to be truly nondiscriminatory and effective, such carriers would include both those who have not prearranged with Ameritech for handling their default LNP traffic, as well as those who may have completed such arrangements, but significantly underestimated their actual load.

Consistent with the need for network reliability, Ameritech intends to continuously monitor on a nondiscriminatory basis the sources and volumes of all traffic being delivered into its network. It will track those carriers that either have not pre-arranged for the delivery of unqueried traffic, or routinely exceed their forecasted demand. Ameritech will also continuously monitor the overall level of LNP queries being handled by various components within its signaling network. If a network jeopardy situation arises, Ameritech will notify the carrier responsible,<sup>13</sup> and request that it temporarily suspend forwarding excess traffic to the extent that it is causing Ameritech's network to exceed the established volume threshold. If

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<sup>12</sup> at ¶78.

<sup>13</sup> Non-prearranged carriers and those whose traffic exceeds 125% of their forecasted volumes.

the carrier refuses to comply and the overload condition persists, Ameritech will block that carrier's traffic at the point of interconnection to the extent necessary to reduce traffic levels to appropriate levels.

### III. CONCLUSION.

For the reasons described above, Ameritech's Query Service tariff should be allowed to remain in effect, as filed.

Respectfully submitted,

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**Attachment 1 to Direct Case of Ameritech**  
**Rationale for Inclusion of SS7 Costs**

Provision of number portability, and the Query Service require the use of the SS7 signaling network. As a result, Ameritech incurred costs to modify its SS7 signaling network so it could accommodate LNP and handle the added volume of signaling traffic involved. These costs would not have been incurred but for the obligation to provide LNP and are thereby directly related to providing LNP, and as such, should be included in the query charges.

In the following sections Ameritech will describe the modifications and augmentations to its signaling network that were implemented solely to implement LNP and to offer the query service, and as explained, would not have been made absent a mandate to provide the service.

**SMS/SCPs**

Ameritech has deployed a Service Management System (SMS) and several associated pairs of Service Control Points (SCPs) to store routing information and process LNP queries for ported numbers. Collectively referred to as the LNP database, the hardware and operating software for this system has been deployed for the exclusive use of processing calls to



ported numbers. No other service (e.g., 800, voice mail, etc.,) uses this resource, and it would not have been deployed except to provide LNP and the query service.

### **STPs**

The Signal Transfer Points (STPs) within Ameritech's network process and route all SS7 signaling messages, including LNP queries. In essence, they act as the "traffic cop", examining each message and determining the appropriate signaling node that should process it. The LNP SCPs are directly accessed by certain STPs via A-links (56Kb/s transmission facilities) for forwarding LNP queries. New dedicated link terminations (ports) had to be added to the STPs for these SCP links, as well as for additional links to LNP- equipped tandems, end offices and other STPs (required specifically to accommodate the increased message volumes due to LNP queries). Again, these ports would not have been installed except to provide LNP and the query service.

In addition, the introduction of LNP and the query service has necessitated a more complex screening process in the STPs, to examine all of the dialed digits, rather than simply the NPA/NXX, to determine the proper routing. In order to create adequate capacity to perform this

function, Ameritech had to increase memory (software and hardware) within its STPs to handle the additional translation tables needed to accommodate the significant increase in 10-digit Global Title Translations (GTTs). Once more, this added capacity would not have been required but for the obligation to provide LNP and the query service.

### **SS7 Links**

Ameritech has included in its LNP and query costs, the costs of provisioning new SS7 links (A-links & B-links) specifically deployed to accommodate the increase in signaling traffic due to LNP and the query service. This includes the new links to the dedicated LNP SCPs, as well as additional (SSP) links required to handle LNP queries originating from end offices and tandems, and additional inter-STP links (B-links) needed to route LNP queries from local SS7 clusters to more-distant SCPs (databases).

Ameritech's SS7 network architecture homes the LNP SCPs off of local STPs (LSTPs) located at strategic and diverse points throughout its network. This unique layout, which has been reviewed by experts within the industry, ensures maximum diversity and distribution of the LNP and query traffic. One of its purposes is to ensure that a fault or overload

condition at one mated pair of LNP SCPs does not isolate an entire geographic area, and thereby the ability to complete calls to ported numbers. By necessity this required that links between STPs serving different areas within the Ameritech region be augmented so that queries from (for example) Detroit offices could be routed to the LNP SCP in Elgin, Illinois.

It should be noted, however, that Ameritech has not included any costs for adding links to handle normal future growth. Prior to LNP, Ameritech's links were utilizing, on average, approximately 30% of their unreserved capacity. The introduction of LNP has not only claimed the remaining 70%, but also generated the need for additional links to handle the expected LNP traffic load. As such, Ameritech had to provision additional links to handle normal growth much sooner than planned. The costs of these "growth" links were not included.

### **Link Monitoring**

An ongoing objective is Ameritech's ability to quickly identify and isolate faults within our SS7 signaling network<sup>1</sup>. Although Ameritech's existing monitoring system proved sufficient to provide this functionality in

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<sup>1</sup> This concern is believed to be shared by all network providers, and is driven in part by the SS7 outage that occurred in the Northeast several years ago.

the past, the expanded format and volume of LNP messages, and the increased complexity of the LNP database architecture will render the existing system inadequate and obsolete. The requirement to handle default queries will only exacerbate the current situation. The need for a new monitoring system to support LNP became evident shortly after completion of the Illinois (FCC) field trial, when a message looping condition was discovered which totally exhausted the link set capacity on one of the LNP SCPs<sup>2</sup> which, under live LNP conditions, could have resulted in the inability to complete calls to ported numbers, for portions of selected geographic areas. A more efficient and reliable means of monitoring the SS7 links, and trapping, decoding and tracing suspect signaling messages was needed. Ameritech is now in the process of installing a new link monitoring system that will quickly and accurately pinpoint congestion and trouble conditions within its signaling network. Although the introduction of number portability was the sole driver in the decision to purchase this new system, Ameritech acknowledges that it will utilize the system for other applications and that it will thereby benefit other signaling-based services. As such, the costs of the new system have been allocated across all SS7 services, based upon the relative estimated

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<sup>2</sup> The actual cause was a null voice mail parameter in the SCP record of a ported test number.

usage<sup>3</sup>. The resultant allocation to LNP is approximately 30% to LNP and the query service.

The modifications and additions to these SS7 components were essential to provisioning both LNP and the Query Service. The portion of these costs allocated to Query Service was based upon the relationship of the (estimated) Query Service volume to the total (estimated) LNP query demand which will utilize these signaling modifications and additions. The resulting factor is a 15% allocation of the total SS7 costs to Query Service.

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<sup>3</sup> Measured in message octets.

**Attachment 2 Ameritech's Direct Case  
LNP Query Tariff Investigation OSS Cost**

In the Order, the Commission raised the issue of whether any operations support system (OSS) related costs could in fact be direct costs of providing LNP and the Query Service.

The answer is "yes". During its initial analysis of the impacts of LNP, Ameritech discovered that implementation of LNP would require the development and deployment of several new provisioning and support systems, as well as modifications to a number of existing systems, in order to continue to process requests for service from its customers. Such customers include end users, other interconnecting service providers, competing carriers and those reselling Ameritech services. The additions and modifications were needed not only to process requests for service (including the out-porting and in-porting of telephone numbers) but also to actually install and test the service itself.

Of these systems, four were also required for the provisioning of the Query Service. These systems are the SOAC, Order Path, Number Manager, and NetPilot. Details regarding the specific enhancements made to these four systems follow.

Ameritech stands ready and willing to provide the same level of detail for other systems, including information on how each fits into the actual provisioning process for LNP.

### **SOAC - DSF/FACS**

Modifications to SOAC (Service Order Analysis and Control) were required to efficiently implement Service Activation and Service Assurance for Local Number Portability (LNP). This includes ported out Ameritech TNs to be served out of a TCs switch, ported in TC TNs to be served out of an Ameritech switch. Mechanization of the process was imperative to reduce the time interval involved in supporting these new processes. In addition, the probability of high volume and churn, point to mechanization as a means of cost containment.

SOAC software was enhanced to parse and process new LNP FIDs and map the appropriate data into tags to send to impacted Operating Systems via existing SOAC interfaces. This new SOAC feature provides the necessary LNP data from the service order to involved downstream systems to allow the inventory creation/updating of facility

assignments associated with ported out and ported in TNs. The existing SOAC interfaces included in the enhancement are: LFACS, SWITCH, COSMOS, MARCH, PAWS and NSDB.

In addition to the enhancements to support existing interfaces a new SOAC interface; SOAC/SOA (Service Order Activation), was created to send LNP data from the provisioning flow to the Number Portability Administration Center (NPAC) SMS. This new SOAC interface to SOA was designed as a wire center-level application to application interface. SOAC needed extensive software modifications and table updates to recognize service order involvement for this new interface.

Upon receipt of a service order, SOAC was enhanced to determine whether an order meets the criteria for SOA involvement. New logic was also included to difference SOA involvement on the subsequent pass of an involved order and suppress the message if there was no change in NPAC required data. SOAC changes were required to send pre-completion, correction and cancellation messages to SOA and accept positive or negative acknowledgment from SOA on all passes of an order. Additional modifications were necessary to route errors on negative acknowledgments to the proper work group for resolution.



The SOAC/SOA interface included support for manual transactions and the ability to accept, and route, release TN messages from the NPAC. Existing SOAC inquiries were also updated to reflect whether messages have been sent to SOA.

### **ORDER PATH**

Order Path functions as a Service Order Administration (SOA) system. Order Path processes service orders from Ameritech's SOAC system. Order Path accepts and validates orders, forwards porting requests to the NPAC SMS and provides administrative functions to support porting processes from the NPAC SMS through various downstream systems and work centers.

In addition, customized adapters were required to be developed to support mechanized flow through of service orders from our provisioning systems (i.e. SOAC, MARCH.) Also administrative processes to resolve conflicts and inherent fallout and discrepancy resolution.